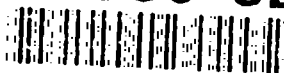


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APPENDICES



LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

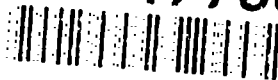
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M-X CLOSELY SPACED BASING

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APPENDICES

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LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT
ENVIRONMENTAL IMPACT ANALYSIS PROCESS DOCUMENTATION
M-X CLOSELY SPACED BASING

Prepared for

United States Air Force
Ballistic Missile Office
Norton Air Force Base, California

By

Henningson, Durham & Richardson, Inc.
Santa Barbara, California

18 October 1982

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SITING CRITERIA AND SUMMARY ANALYSIS

5.1 SYSTEM SITING CRITERIA AND SUMMARY ANALYSIS

The M-X Program Management Directive dated 1 June 1982, in response to OSD guidance, directed studies to identify candidate areas for potential deployment of 100 M-X missiles in 100 capsules using the closely spaced basing (CSB) deployment mode. During these siting studies, the flexibility and survivability of CSB was to be protected through consideration of growth options, such as concealment, enhanced hardening of capsules, and/or addition of ballistic missile defense.

The "Siting Report for M-X Closely Spaced Basing," dated 13 August 1982, documents the analytical procedures used to narrow the entire United States to five potential deployment areas located on or near the following DOD installations:

F.E. Warren AFB, Wyoming
Cannon AFB, New Mexico
Nellis AFB/Indian Springs AAF, Nevada
Hawthorne AAP, Nevada
Kirtland AFB, New Mexico

These suitable geographical areas not only satisfy the operational and technical requirements of the CSB model but also represent locations where system siting would potentially cause the least adverse impact. The remainder of this executive summary addresses the narrowing process.

The initial step in the Comprehensive Siting Analysis Process identified those criteria which were exclusionary in nature and applied them to the entire U.S. Exclusions were established for those items considered essential to the deployment and operation of a survivable CSB system as well as to ensure compliance with legal requirements and Air Force policy. Applications of exclusionary criteria resulted in areas either passing or failing compliance. Areas failing were dropped from further consideration. For example, a major exclusion was the operational (survivability) geotechnical requirements for a minimum of 150 ft depth to rock and water. Areas not having 150 ft depth to rock and water were consequently eliminated from further consideration. Those arrays with 150 ft to rock and water were judged to be minimally adequate; depths greater than 200 ft to rock and water are preferable.

Similarly, in order to permit large vehicle movement, suitable locations having at least 150 ft depth to rock and water must also have a slope of no more than 10 percent. Legal and policy requirements were also translated to exclusionary criteria. For example, areas set aside by Congress and state legislatures for specifically defined uses, e.g., national/state parks and Indian reservations, were excluded. Finally, a minimum parcel size of 15 mi² was established to ensure that the area would be large enough for the missile array. Application of exclusionary criteria resulted in the candidate regions shown in Figure 5.1-1.

Subsequently, 41 DOD installations and the Nevada Test Site were identified to be within 50 mi of suitable areas for potential CSB deployment. Of these, some could potentially accommodate missile array deployment exclusively on DOD-managed land, some on non-DOD managed lands, and some could accommodate potential deployment of missile arrays on either DOD or non-DOD land (Table 5.1-1).

The next step was to establish and apply a minimum standoff of 200 mi from coastlines and 120 mi from international borders. These exclusionary criteria minimize the potential for degradation of M-X command, control, and communications by seaborne or land-mobile jammers. All urbanized areas were excluded to avoid interference with community expansion. The remaining suitable area after application of these exclusionary criteria is shown in Figure 5.1-2.

The next step was to identify suitable areas by considering evaluative factors for array placement. Examples of such evaluative factors include avoidance of producing oil/gas fields, floodplains/wetlands, and highly productive agricultural areas. Array accessibility (i.e., how difficult is the array to reach from the base) was also considered. The Siting Report provides a complete list of exclusionary criteria and evaluative factors.

A thorough evaluation of candidate areas resulted in nine locations for potential system deployment. Additional data on each area were then developed by reviewing existing base planning documents, performing more detailed geotechnical studies, and conducting field visits. These data were then used to determine which areas would be retained for further study. The resulting list is F.E. Warren AFB,

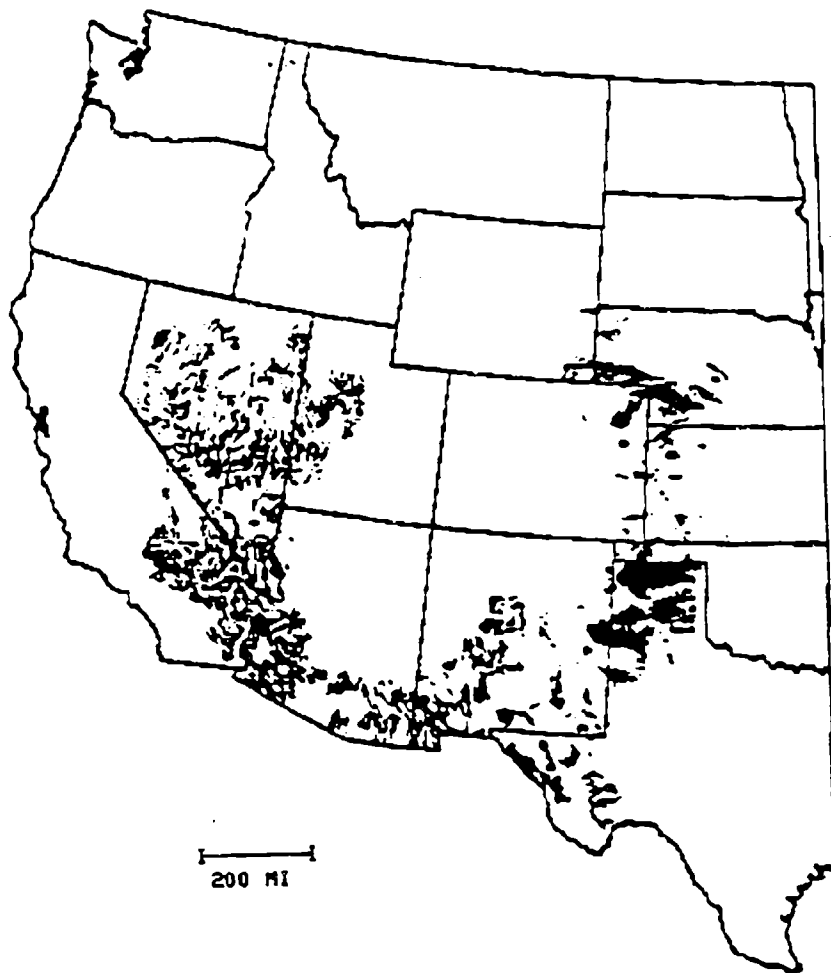


Figure 5.1-1. Geotechnically suitable land - candidate regions (27 July 1982).

Table 5.1-1. Initial list of DOD/DOE installations potentially suitable for M-X deployment.

Array Land		Installation
DOD	Non-DOD	
	X	1. Buckley Air National Guard Base, CO
X		2. Camp Roberts, CA
	X	3. Cannon AFB, NM
X		4. Chocolate Mountain, CA
X	X	5. China Lake Naval Weapons Center, CA
	X	6. Davis-Monthan AFB, AZ
X	X	7. Dugway Proving Ground, UT
	X	8. El Centro Naval Air Facility, CA
X	X	9. Edwards AFB, CA
X	X	10. Fallon Naval Air Station, NV
X	X	11. Fort Irwin (USA), CA
X	X	12. Fort Huachuca (USA), AZ
	X	13. Fort Carson (USA), CO
X	X	14. Fort Bliss (USA), TX
	X	15. F. E. Warren AFB, WY
	X	16. Fitzsimmons Army Medical Center, CO
	X	17. Gila Bend AAS, AZ
	X	18. George AFB, CA
X	X	19. Hawthorne Army Depot, NV
	X	20. Holloman AFB, NM
	X	21. Indian Springs AAF Auxiliary Field, NV
	X	22. Kirtland AFB, NM
	X	23. Lowry AFB, CO
X	X	24. Luke AFB, AZ
	X	25. March AFB, CA
X		26. Melrose AFR, NM
	X	27. Navajo Army Depot, AZ
	X	28. Naval Observation Station, AZ
X	X	29. Nellis AFB, NV/Nellis Air Force Range
	X	30. Nevada Test Site (DOE), NV
	X	31. Norton AFB, CA
	X	32. Peterson Field (USAF), CO
	X	33. Reese AFB, TX
	X	34. Rocky Mountain Arsenal (USA), CO
	X	35. Pueblo Army Depot, CO
X	X	36. Twenty-Nine Palms (USMC), CA
X	X	37. Tooele Army Depot, UT
	X	38. Tooele Army Depot South, UT
X	X	39. White Sands Missile Range (USA), NM
	X	40. Williams AFB, AZ
X	X	41. Yuma Proving Grounds (USA), AZ
	X	42. Yuma Marine Air Station, AZ
17	39*	TOTAL

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*Including Nevada Test Site (DOE Land)

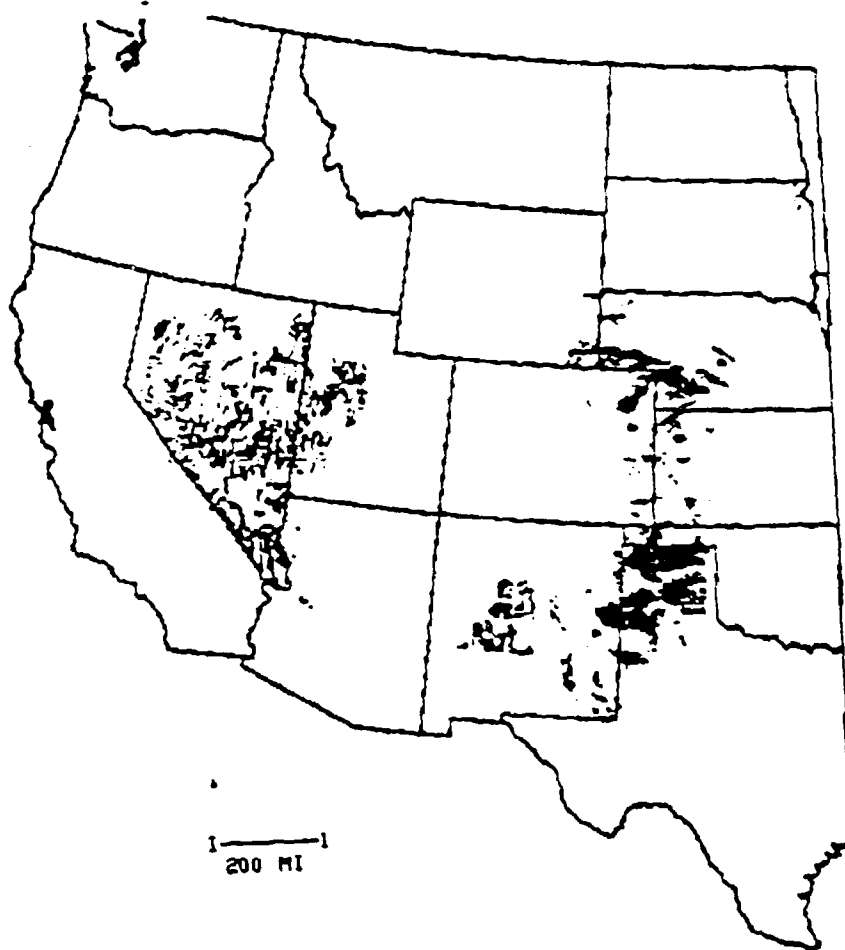


Figure 5.1-2. Remaining suitable area - candidate regions
(27 July 1982).

Cannon AFB, Kirtland AFB, Indian Springs AAF/Nellis AFB, and Hawthorne AAP. Each base and its associated array(s) are depicted in the succeeding section of this summary along with the associated rationale for its selection.

F.E. Warren AFB (base population 4,000) is a Strategic Air Command Base located on the outskirts of Cheyenne, Wyoming (population 47,000), and currently supports the operation of 200 Minuteman III missiles. Adequate land is available onbase for technical facilities, and a runway is available nearby by Cheyenne Municipal Airport. Two potential array locations, primarily on private land, are near the base. The closest is approximately 10 mi northwest of the base with convenient access, whereas the second is about 40 mi east within the Minuteman field. Both arrays possess growth potential, could be defended, and have approximately 200 ft depth to water and rock. The current land use is primarily grazing on the west site and farming on the east site, while potential exists for oil and gas recovery (see Figure 5.1-3).

Cannon AFB (base population 4,500) is a Tactical Air Command Base located 5 mi west of Clovis, New Mexico (population 32,000), and currently supports a training mission for F-111Ds utilizing the Melrose Range. The base would likely require expansion for technical and support facilities. One potential array is located on private land approximately 25 mi northwest. Good potential exists for concealment and defense, and some areas may have depth to rock and water approaching 300 ft. The primary land use is agriculture. Some potential exists for oil and gas recovery (see Figure 5.1-4).

Kirtland AFB (base population 25,000 (80 percent civilian)) is a Military Airlift Command base adjacent to Albuquerque, New Mexico (population 446,900), and supports the Air Force Weapons Laboratory and Sandia National Laboratory plus other missions. Adequate land for technical and support facilities is available onbase. Three potential arrays are located on private land within 2540 mi of the base, and most possess good potential for concealment, defense, and depths of rock and water in excess of 150 ft. There are six Indian reservations within 25 mi and three designated wilderness areas east and southeast within 18 mi of Kirtland AFB. Accessibility is adequate. Land use in the potential area is primarily agricultural (Figure 5.1-5).

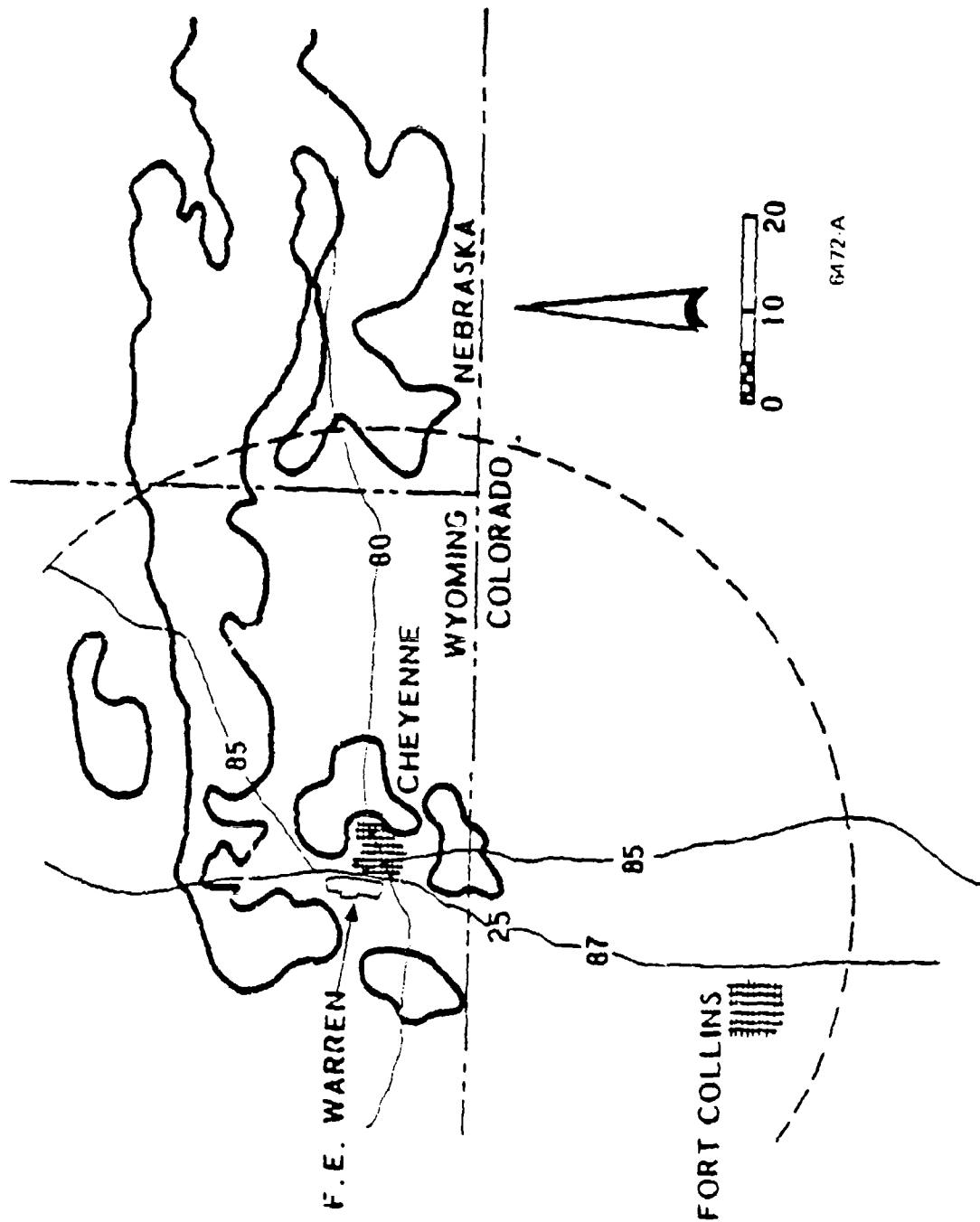


Figure 5.1-3. F. E. Warren AFB.

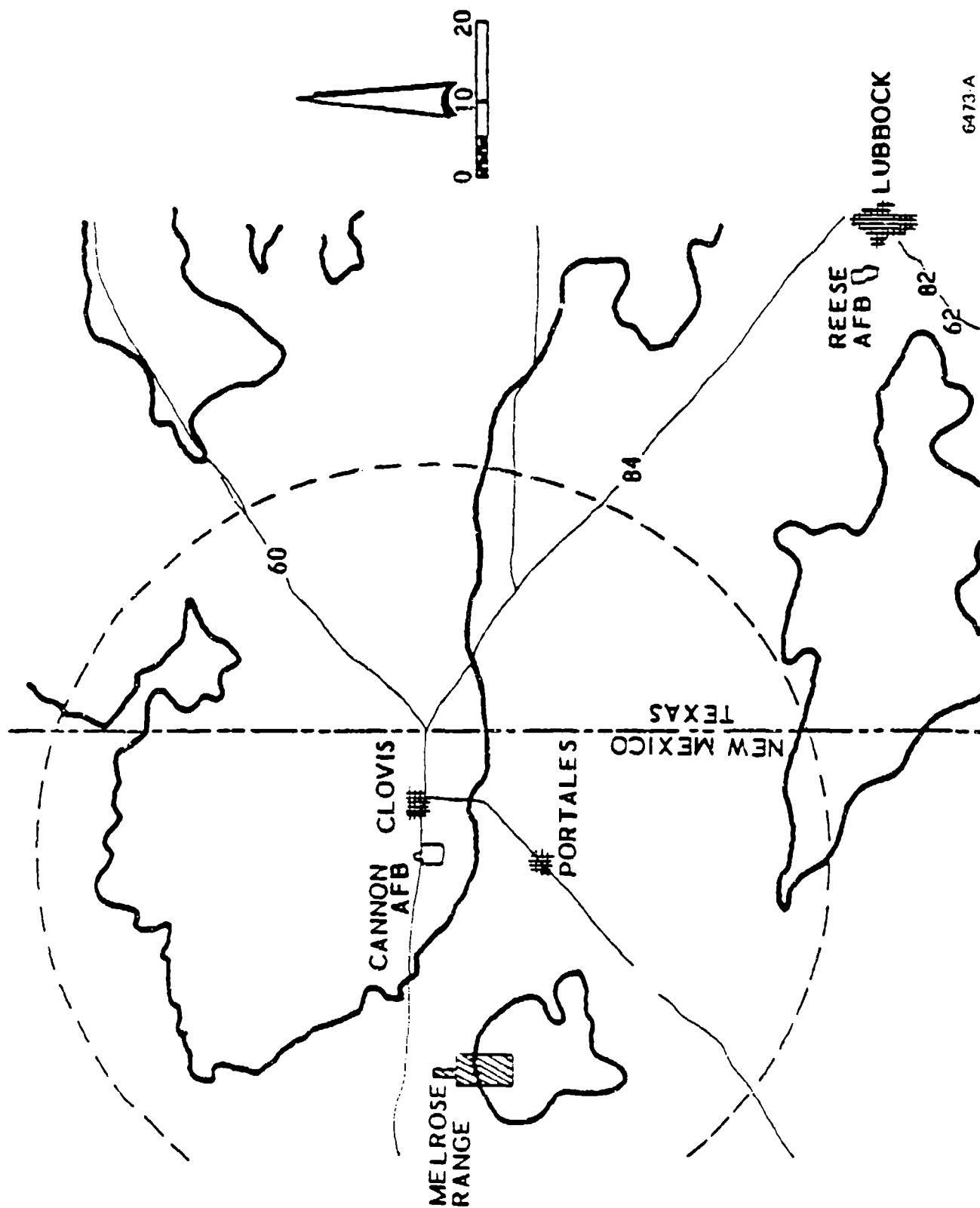


Figure 5.1-4. Cannon AFB.

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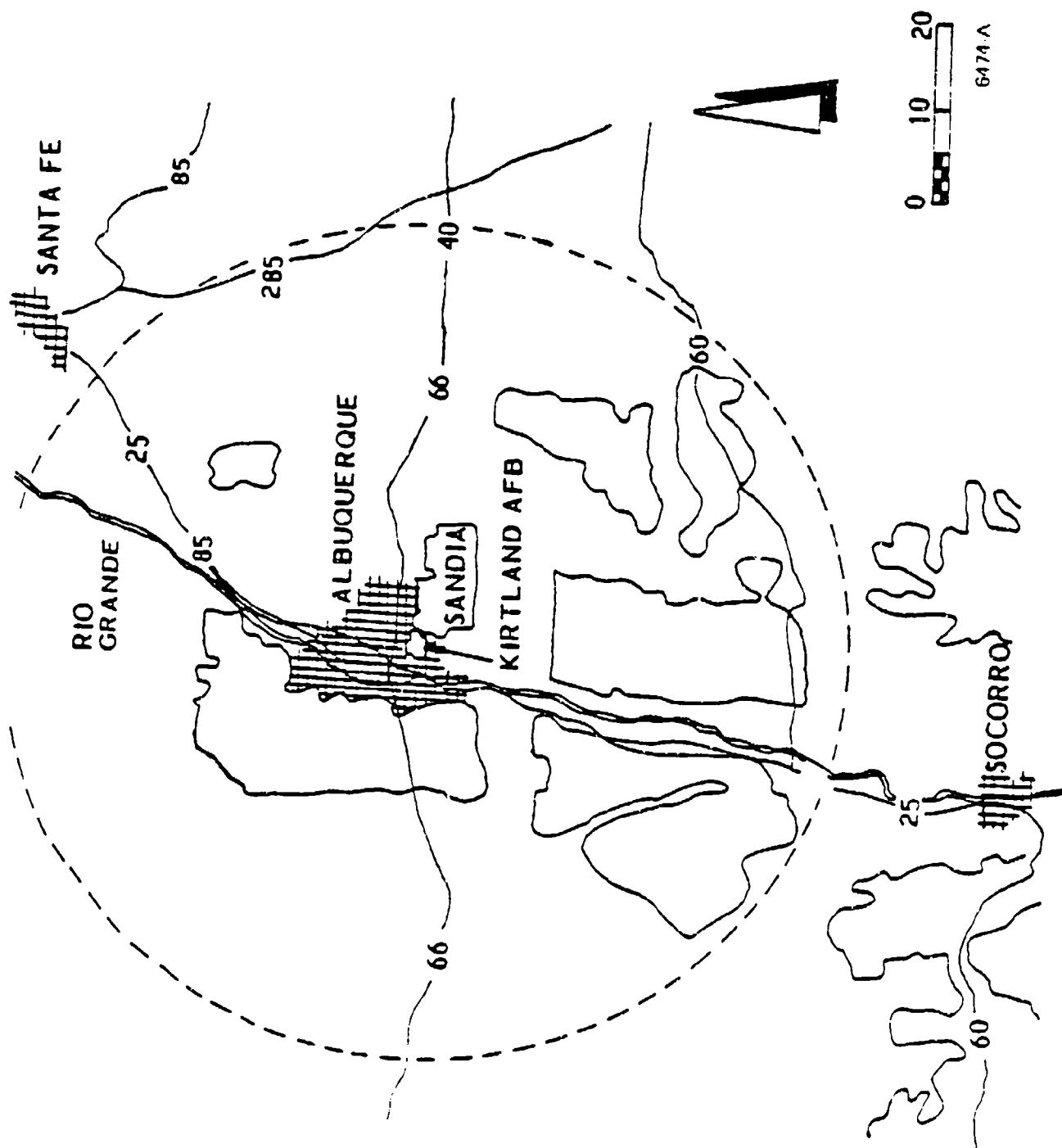


Figure 5.1-5. Kirtland AFB.

Indian Springs AAF and Nellis AFB are operated by the Tactical Air Command to support aircrew training using the Nellis Ranges and is located near Las Vegas, Nevada (population 280,000). The base population is approximately 9,400 military and civilian personnel. Potential array locations exist on public, DOE, and DOD lands. Two public land parcels located approximately 50 mi southwest of Nellis have some potential for 300 ft to rock and water. Both suitable public parcels can accommodate concealment, but only one can accommodate defense. The third site is located in the southwest corner of the Nevada Test Site (DOE) on Jackass Flats and has moderate potential for concealment, marginal potential for defense, but excellent depth to rock and water. One of three potential locations for nuclear waste disposal in the United States is approximately 10 mi northwest of the array location. The array location is compatible with current land use. The last array site is located on the Nellis South Range in Indian Springs Valley and has some potential for growth, can be defended, and has very good depth to rock and water. Major impacts on the TAC training mission could be anticipated, depending upon array placement and future growth. The Indian Springs AAF is small but can accommodate technical facilities. It currently has a population of approximately 270 personnel to support its mission. This array is located on the Desert National Wildlife Range and is surrounded by a Wilderness Study Area (Figure 5.1-6).

Hawthorne AAP is located in west central Nevada approximately 130 mi southeast of Reno and is used for conventional ammunition production, testing, storage, and disposal. The population of Hawthorne, Nevada, is 3,000, while the base employs 917, primarily civilian contractor personnel. The base has sufficient space for the construction of technical and support facilities, while the array could be placed within the controlled storage area on the installation. Mission compatibility is yet to be determined. While some potential for concealment exists, terrain problems make the array difficult to defend. Depth to rock and water exceeds 300 ft for three quarters of the suitable area on which an array could be deployed. Accessibility is very good (see Figure 5.1-7).

Following the examination of DOD installations within 50 mi of geotechnically suitable land, it became apparent that there are three other areas of interest based on their superior potential for survivability (approximately 300 ft or greater to rock and water) and suitability for concealment and defense growth options. These areas

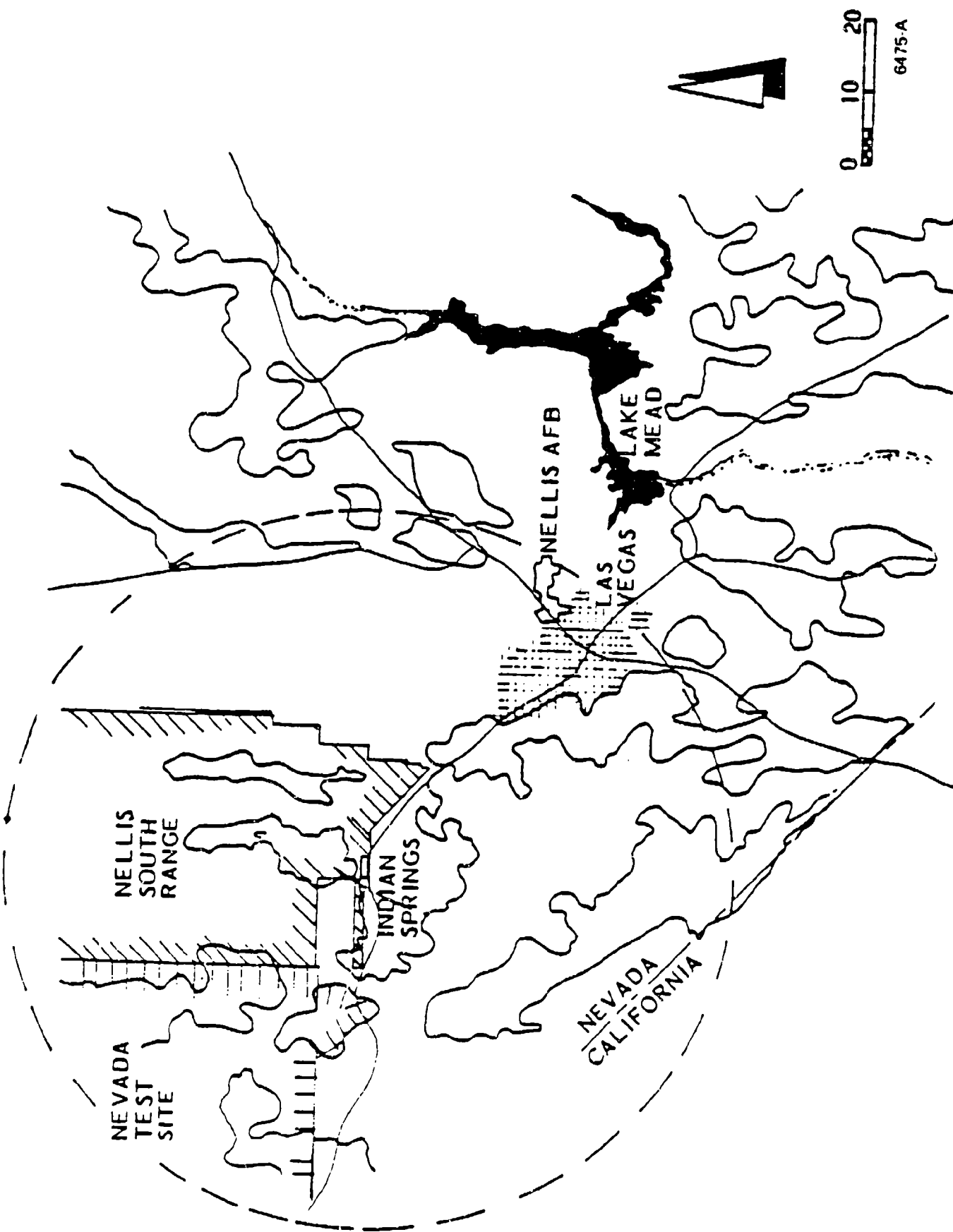


Figure 5.1-6. Indian Springs/Nellis AFB.

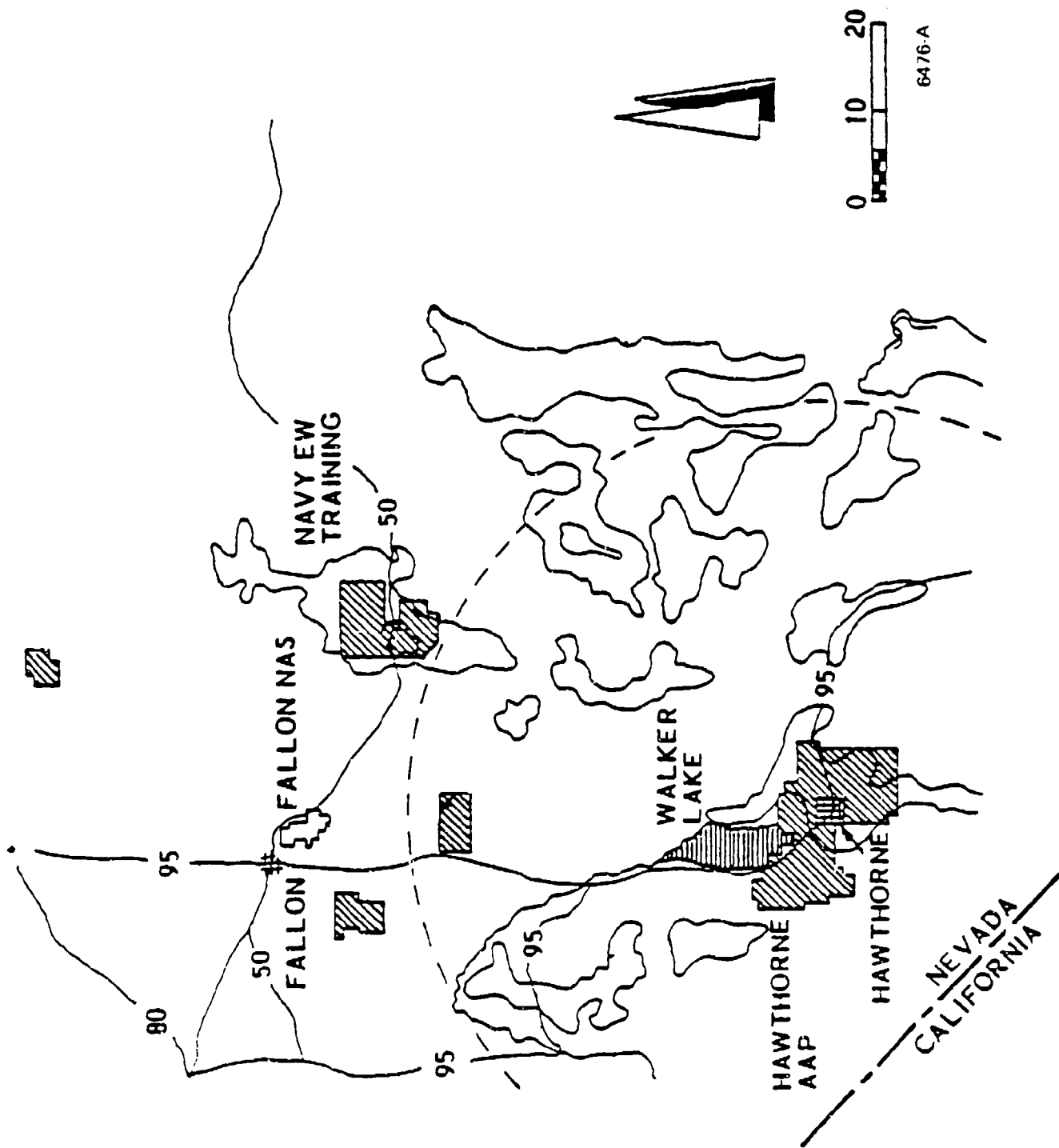


Figure 5.1-7. Hawthorne AAP.

are located near Roswell, New Mexico, Amarillo/Dalhart, Texas, and in central Nevada. If M-X were to be deployed in these areas, a new main operating base would be required. In these three cases land would also be required for both the array and the new operating bases. (See Figures 5.1-8, 5.1-9, and 5.1-10.) Preliminary analyses of these three areas are included in the Siting Report.

Siting studies are continuing and will be used as inputs to the environmental impact analysis process, which, in turn, will aid in other M-X decisions.

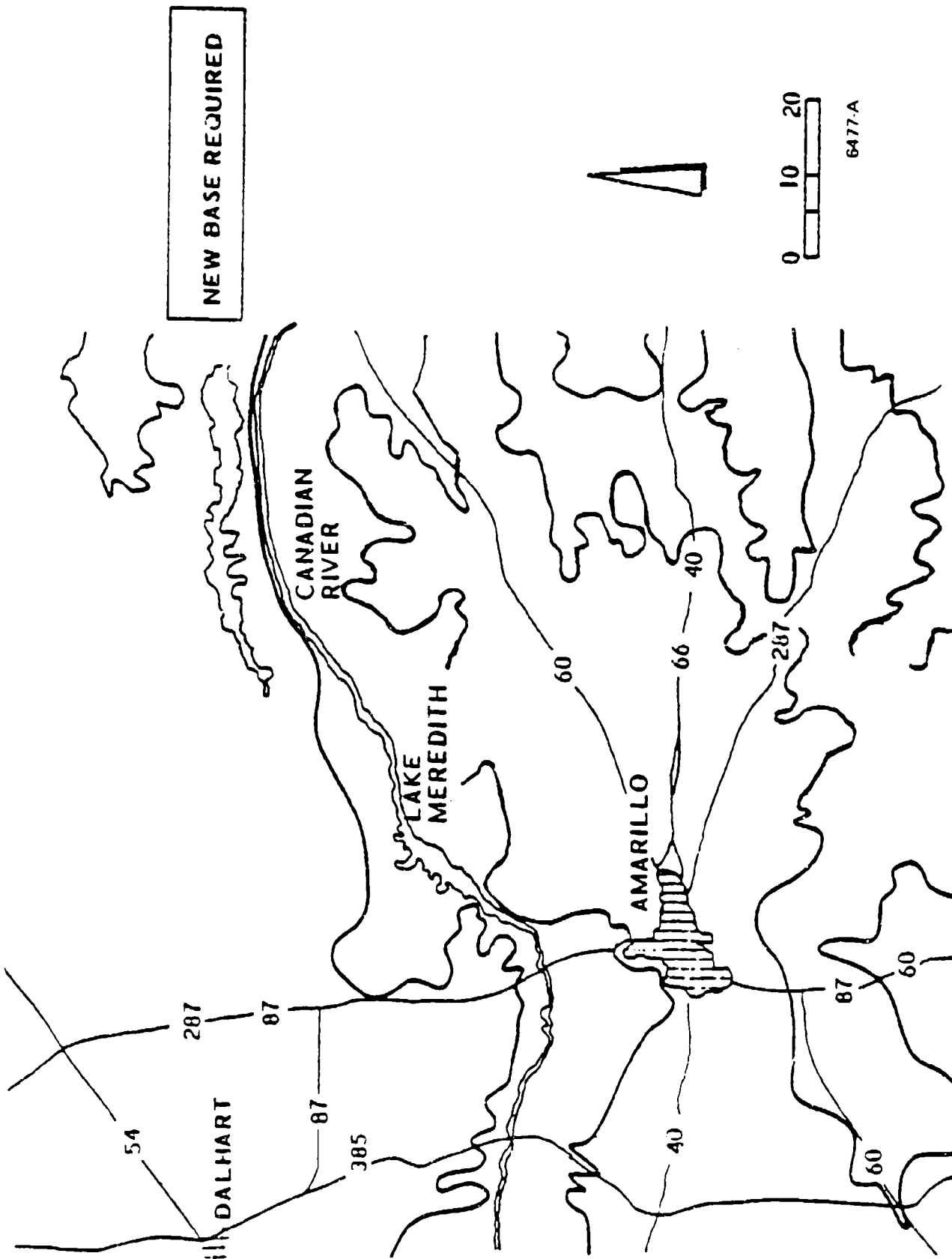


Figure 5.1-8. Amarillo/Dalhart, Texas.

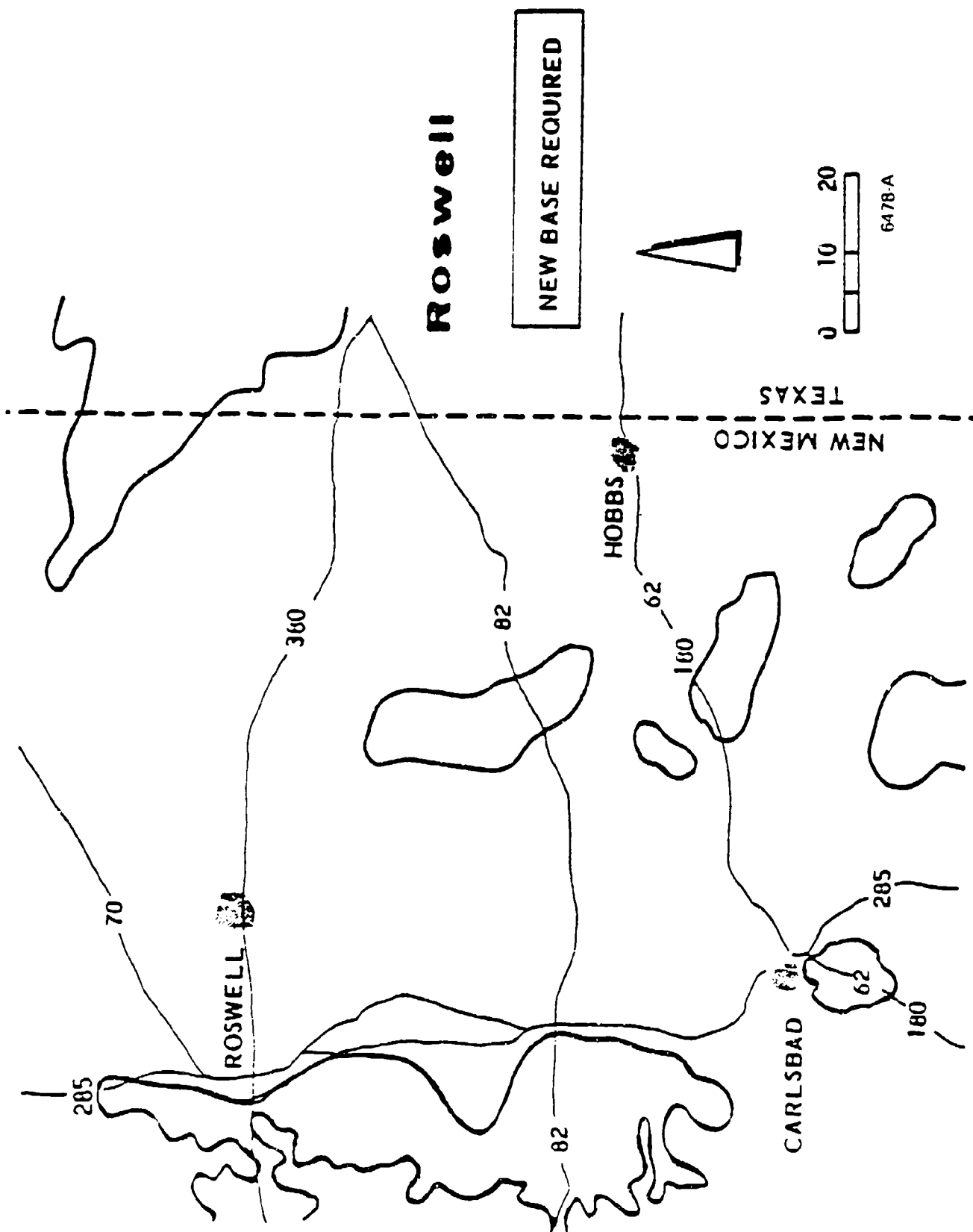
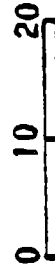


Figure 5.1-9. Roswell, N. Mex.

Central Nevada

NEW BASE REQUIRED



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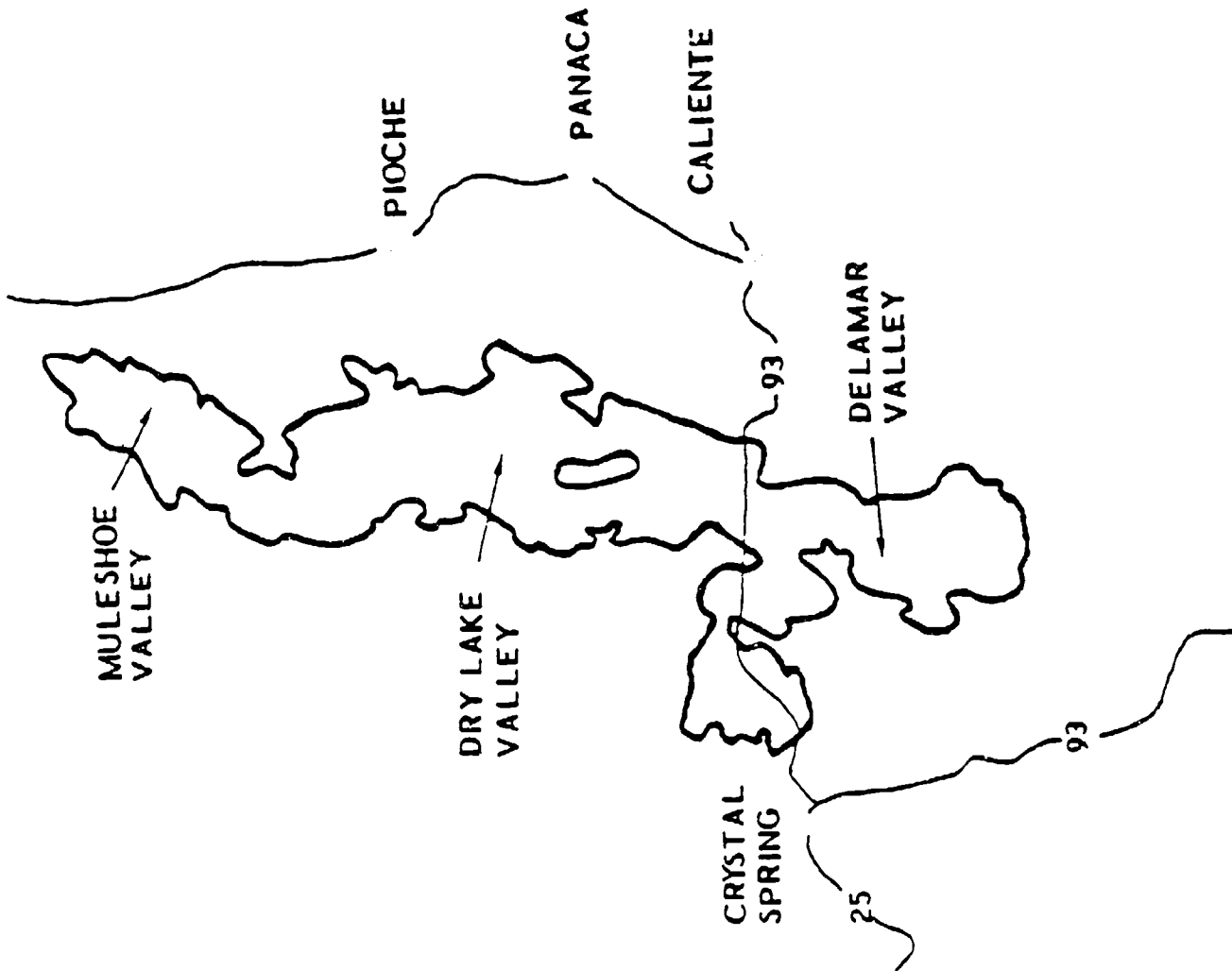


Figure 5.1-10. Central Nevada.

AUTHORIZING ACTIONS

5.2 AUTHORIZING ACTIONS

Federal, state, and local agencies may require permits or other authorizing actions for any phase of the project, from initial studies to determine the suitability of a parcel of land to the operation of a new facility that has the potential to emit air pollutants. Table 5.2-1 lists federal authorizing actions that could be necessary for the M-X program. Table 5.2-2 lists the types of authorizing actions that are often required at a state or local level.

Table 5.2-1. FEDERAL AUTHORIZING ACTIONS
LAND-RELATED AUTHORIZING AGENCIES

<u>Project Feature</u>	<u>Permit</u>	<u>Authorizing Agency</u>	<u>Authority</u>	<u>Lead Time</u>
Occupation, use, or traversing of land for roads, railroads, power, construction camps, storage yards, etc.	Right-of-Way Grant (BLM or Forest Service Lands)	Bureau of Land Management (BLM)/ U. S. Forest Service (USFS)	Federal Land Policy and Management Act (FLPMA), 43 U.S.C. 1701-1782	Approx. 1-3 months (Congressional action on land withdrawal is a prerequisite)
Occupation, use or traversing of land for power and railroads over national wildlife refuges	Rights-of-Way Consultation	Fish and Wildlife Service (FWS), Dept. of Interior (DOI)	Fish & Wildlife Coordination Act, 16 U.S.C. 661 et seq., Section 4(f); Department of Transportation Act of 1966, 80 Stat. 931, P.L. 89-670; National Wildlife Refuge System Administration Act, P.L. 89-669	Not presently known
Occupation, use, or traversing of land for power and communication distribution systems, pipelines over national wildlife refuges	Rights-of-Way Consultation	FWS/DOI	Fish & Wildlife Coordination Act, 16 U.S.C. 661 et seq., National Wildlife Refuge System Administration Act, P.L. 89-669	Not presently known
Obtaining jurisdiction over, use of, or occupation of public land for IDA, DAA, and CB facilities and structures	Withdrawal Land Order	BLM/USFS	FLPMA 155-158 Engle Act, 43 U.S.C.	Approx. 1 year (depending upon time for Congressional Action)
Occupation, use or traversing of public land to study, monitor, or perform other investigations	Temporary Use Permit	BLM/USFS	FLPMA, Secs. 103(f), 302(b), 501(a)(7), 504(a), and 507(a)	Approx. 3 months

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Table 5.2-2. STATE AND LOCAL AUTHORIZING ACTIONS. (page 1 of 2)

Occupation, use or traversing of State land for roads, rail roads, power, construction camps, storage yards, etc.	Rights-of-Way or Easements	Various State Land Agencies	State Law
Obtaining jurisdiction over, use of, or occupation of State land for operating bases or technical facilities	Purchase, exchange or other conveyance	Various State Land Agencies	State Law
Occupation, use or traversing of State land to study, monitor or perform other investigations	Lease or Easement	Various State Land Agencies	State Law
Acquire State or Private lands for roads, facilities, utilities, construction activities.	Purchase, Eminent Domain, Gift	Department of Defense (DOD), Private Owners; may require U.S. Congressional action	Authorization and Appropriation Legislation, Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, 42 USC 4601, <u>et seq.</u>
Assure compliance with local plans for use and development of land (for residential, gravel pits, transmission lines, etc.)	Development and approval of new zoning programs, including PUDs and variances	County and City Legislative Agencies	Local and State Statutes, Regulations and Development Plans
Water appropriation - surface water, groundwater and wells	Permit	State Engineer	State Statute/Federal Law

Table 5.2.2 STATE AND LOCAL AUTHORIZING ACTIONS. (page 2 of 2)

Small air pollution sources: storage containers of gasoline petroleum; distillate; volatile organic compounds; concrete batch plants; incinerators; boilers; rock crushers; diesel generators	Registration Certificate; Operating Permit; Notice of Intent to Construct; Permit to Construct	State Air Quality Agency	State Law, Clean Air Act, 42 USC Sec. 7410 (a) (2) (D), 110 (a) (4)
Open burning of construction wastes	Permit or Approval	State and Local Air Quality Agencies	State and Local Laws and Regulations
Effluent discharge into or below the surface of the ground; underground injection of waste	Permit	State Water Quality Agency	State Law
Sanitary Landfill Site	Approval/Permit	Local and State Health/Waste Disposal Agency	State Law
Wastewater Treatment Works, design and construction	Permit	State Water Quality Agency	State Law
Potable Water Supply, design and construction	Permit/Design Approval	State Department of Health	State Law
Hazardous or Industrial Waste Disposal	Permit	State Department of Health	State Law
Excavation or construction im pacting cultural resources	Permit	State Historical Societies	State Law

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GLOSSARY

5.3 GLOSSARY

Alluvial Fan: a fan shaped sedimentary deposit composed of materials eroded from a mountain range and deposited by a drainage issuing from a canyon mouth.

American Indians: used in a collective sense to refer to all the peoples native to the American continents, usually excluding Eskimos and Aleuts.

American Indian Cultural Resources: American Indian cultural resources include districts, sites, structures, biota, objects, and other evidence of human use considered to be of cultural value and importance by American Indians for traditional, religious, curatorial, and other reasons. These resources may be prehistoric sites and artifacts, historic American Indian areas of occupation and events, and other archaeological/historical features that may be eligible for nomination to the National Register of Historic Places. These resources may include contemporary sacred sites and areas, materials for the production of sacred objects, hunting and gathering areas, craft materials, and other ethnobotanical, ethnobiological, and ethnogeological resources.

American Indian Socioeconomic Resources: American Indian socioeconomic resources include all those elements that serve to ensure the material survival and well-being of Indian tribes and people. These include land-based economic activities, such as farming, ranching, mining, recreation, hunting, fishing, and gathering conducted on reservation and non-reservation lands. The most critical natural resources are productive land and sufficient water for domestic, agricultural, and industrial needs. Any discussion of socioeconomic resources must take into account tribal economic data, such as income, labor force, and subsistence activities as well as associated community infrastructure and demographic variables.

Atmospheric Dispersion: the transport and mixing of gases or suspended particles in the atmosphere by winds and turbulent processes.

Aquifer: the water-bearing portion of subsurface earth materials that presently yields or is capable of yielding useful quantities of water to wells.

Bajadas: broad sloping surfaces descending from the base of mountains toward valleyfloors that are formed from the coalescing of adjacent alluvial fans.

Baseline: the characterization of an area under no-project conditions.

Biota: all the living organisms in an area or occupying a habitat.

Candidate Species (also Candidate Threatened or Endangered Species): taxa (species or subspecies) of plants or animals currently being considered for listing by the U.S. Fish and Wildlife Service as threatened or endangered under the Endangered Species Act of 1973, as amended. In this document, candidate threatened and endangered species are those under review for federal listing by the U.S. Fish and Wildlife Service (USFWS) as category 1 and 2 species (Federal Register, 12/15/80). The U.S. Fish and Wildlife Service has determined that there is sufficient information on hand to support either the biological appropriateness or the probable appropriateness of listing these species as threatened or endangered.

Capacity: in transportation studies, the maximum number of vehicles having a reasonable expectation of passing over a given section of a lane or a roadway in one direction (or in both directions for a two-lane or a three-lane highway) during a given time period under prevailing roadway and traffic conditions.

Capital Outlays: expenditure of money for constructing additional public facilities, e.g., schools, including the purchase of land as well as the cost of labor and materials to build facilities.

Cenozoic: an era in geological history extending from the beginning of the Tertiary period, 70 million years ago, to the present time, characterized by the rapid evolution of mammals, birds, grasses, shrubs, and higher flowering plants.

Chukar: a partridge-like game bird introduced into arid parts of the west.

Climate: the prevalent or characteristic meteorological conditions, and their extremes, of any given location or region.

Coal Slurry: a mixture of water and finely pulverized coal.

Cooling Degree-day: a degree elevation in the mean outdoor temperature above 75°F averaged over a 24 hour period.

Composite Index: an index, constructed from interrelated groups of well-being measures, that tends to counteract the limitations of any one variable. For example, the alienation index is constructed from data on suicides and deaths from cirrhosis of the liver.

Cultural Continuity: the retention of traditional roles, statuses, and identities through time by a specific cultural group, often occurring in spite of the addition of foreign language proficiency and the adoption of modern technological skills and attitudes.

Cultural Resources: nonrenewable remains of human activities, occupations, and endeavors, as reflected in sites, buildings, structures, or objects, including works of art, architecture, and engineering. Cultural resources are commonly discussed as prehistoric and historic values, but each period represents a part of the full continuum of cultural values from the earliest to the most recent.

Cumulative Effects: the aggregation of project-induced effects and the effects of other concurrent projects occurring simultaneously in the project's region of influence. The term cumulative has also been used to denote aggregated effects over several years as against net effects in a given year.

Depauperate: used in reference to a biological community having a relatively low diversity of species.

Designated Wilderness Area: a tract of land that has been approved congressionally for incorporation into the National Wilderness Preservation System as mandated by the Wilderness Act of 1964.

Direct Effects: effects resulting solely from project implementation.

Dry-Bulb Temperature: the temperature indicated by an ordinary thermometer.

Dry Croplands: croplands that receive their moisture from rainfall only, as opposed to irrigated croplands, which receive water from man-made irrigation systems. Dry croplands generally produce grain crops.

Ecosystem: a group of plants and animals, including their environment, arranged in a trophic structure and participating in energy flow and nutrient cycling. See also trophic.

Ecozone: an environmental zone with a relatively distinct ecology, such as pinyon-juniper zone.

Effect: a change in an attribute. Effects can be caused by a variety of events, including those that result from project attributes acting on the resource attribute (direct effect); those that do not result directly from the action or from the attributes of other resources acting on the attribute being studied; those that result from attributes of other projects or other attributes that change due to other projects (cumulative effects); and those that result from natural causes (e.g., seasonal change).

Endangered Species Act: the policy underlying the Endangered Species Act and the 1978 and 1979 amendments to it to ensure the conservation of endangered and threatened fish, wildlife, invertebrate, and plant species.

Endemism: the condition in which a species is restricted to a specified area. This area may be local (localized endemic) or regional (regional endemic).

Energy and Utility Infrastructure: the capital facilities that make up energy and utility systems.

Environmental Consequences: in environmental impact studies, includes 1) the impacts of a project's alternatives including the proposed action, 2) the adverse effects that cannot be avoided should the proposed action or one of its

alternatives be implemented, 3) the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and 4) the irreversible or irretrievable commitments of resources that would be involved should the proposed action or one of its alternatives be implemented.

Ethnographic Research: the detailed, first-hand, systematic collection of facts about a contemporary social unit, usually a small-scale society or culture, used to produce a descriptive case study.

Floodplain: for inland waters, the area subject to a 1 percent or greater chance of flooding in any given year (i.e., the 100-year floodplain). Executive order 11988, Floodplain Management, places limitations on construction projects in floodplains and promulgates guidelines to ensure public health and safety both to protect against property loss and to protect natural and beneficial values of floodplains.

General Debt Outstanding: the face value of general obligation bonds, generally issued by a government entity. Such bonds are similar to loans and are issued to obtain financing, often for capital improvements.

Habitats: the places or physical areas with particular kinds of environments in which organisms live.

Heating Degree-day: a degree declination in the mean outdoor temperature below 65°F averaged over a 24 hour period.

Holocene: the most recent period in geological history, beginning about 25,000 years ago, marked by the rise of Homo sapiens.

Imhoff Tank: a two-storied tank structure used to separate decomposing sludge from a flowing sewage stream.

Impact: an assessment of the meaning of changes in all attributes being studied for a given resource, an aggregation of all the effects, usually measured using a qualitative and nominally subjective technique.

Indirect Effects: effects resulting from the attributes of other resources acting on the attribute being studied. For example, direct project employees will spend some of their income locally. As a result, local industries will tend to hire more workers as they expand in response to the increased demand. This additional employment is termed an "indirect effect".

In-migrants: all people relocating into a defined geographic area, usually calculated on an annual basis.

In-migration: movement of population into a community or region.

Intercontinental Ballistic Missile (ICBM): a large land-based missile capable of accurate delivery over intercontinental ranges (usually greater than 5,000 mi).

Intergovernmental Revenues: money transferred among governments from shared tax proceeds, federal grants, and payments for reimbursable services performed for one government entity by another.

Intertie: a transmission line used for the transfer of electrical power between two electric utility companies.

Lacustrine: pertaining to, produced by, or formed in a lake or lakes; growing in or inhabiting lakes; characterized by lakes or lakebeds.

Level of Service: in transportation studies, a qualitative measure of the flow of traffic along a given road in consideration of a wide variety of factors, including speed and travel time, traffic interruptions, and freedom to maneuver. Levels of service are designated A through F, A being a free flow condition with low volumes and high speeds and F being a congested condition of low speeds and stop-and-go traffic. Intermediate levels describe conditions between these extremes.

Long Term: denotes the steady-state operations phase of the project when a constant level of project employment is attained. See also **Short Term**.

Megafauna: various species of large mammals that became extinct in North America sometime before 4,000 B.C. These mammals include the mammoth, giant bison, camel, and giant sloth.

Mesic: pertaining to an environment having a moderate supply of moisture (e.g., a deciduous forest) and contrasting with xeric and hydric, referring to very dry (e.g., desert) and very wet or saturated environments (e.g., a bog), respectively.

Mesozoic: an era in geological history, ranging from about 230 to 70 million years ago, characterized by the development of reptiles.

Meteorology: the scientific study of the atmosphere.

Microenvironment: the environmental conditions actually experienced by an organism in its environment. Examples of microenvironments experiencing very different environmental conditions within the same locale would be a burrow, the area under a rock, a shaded surface, and a sunny surface.

Mil: one-tenth or one cent.

Miocene: an epoch of the Tertiary period, 35 to 15 million years ago, marked by the development of apes and appearance of ancestral gibbons.

Mitigations: methods to reduce or eliminate adverse project impacts. For example, project demand for local housing units could stress area housing markets; this impact could be reduced by project sponsors providing temporary housing for their employees.

Midden: a refuse heap.

National Wildlife Refuge: lands set aside for their wildlife habitat values and managed by the U.S. Fish and Wildlife Service for the conservation or enhancement of waterfowl, big game, endangered species, and non-game species populations.

Non-agricultural Lands: lands that are neither cropland no productive rangeland.

Nonattainment Area: an area that has been designated by the Environmental Protection Agency (EPA) and the appropriate state air quality agency as violating one or more National Ambient Air Quality Standards (NAAQS).

Noncompliance: action contradicting a specified procedure or causing results outside specified limits.

Nonrenewable Resources: finite resources having no appreciable natural production, crude oil, for example.

Operations and Maintenance Expenditures: public payrolls and purchases of goods and services for governmental activities.

Outdoor recreation: all outdoor recreational activities that take place away from the resident of the participants, excluding such activities as urban recreation and organized sports.

Paleo-Indians: earliest documented hunting and gathering groups in North America, generally dating from 12,000 - 6,000 B.C.

Paleontological Resources: fossilized organic remains from past geological periods.

Paleozoic: an era in geological history marked by the culmination of almost all invertebrates except the insects, and in its later epochs, the first appearance of land plants, amphibians, and reptiles. It lasted from perhaps 600 to 230 million years ago.

Peak Year: the year in which some particular project-related effect, e.g., total employment, is greatest.

Pleistocene: the last million years of geological history, marked by repeated glaciation and the first indication of social life in human beings.

Pluvial Periods: geologic time periods having higher rainfall in south and southwestern North America and coinciding with the glaciated periods in the north.

Population Density: the number of people per unit area, usually per square mile, at a given time.

Prevention of Significant Deterioration (PSD): air quality regulations intended to maintain air quality by regulating the amount of further deterioration. Lands are designated as Class I, II, or III according to the amount of allowable further degradation.

PSD Class I Areas: lands in which existing air quality is to be most stringently maintained.

PSD Increments: maximum pollutant concentration increases allowed to all new sources in PSD Class I, II, and III areas.

PSD Increment Consumption: the extent to which the total allowable PSD increment has been used up in an area by all new sources that are subject to PSD regulations.

Quantity Distance Criteria: safety zones or required safe distances prescribed by Department of Defense Standard 5154.45 and Air Force Regulation 127-100 between places where explosives (including rocket propellants) are based, stored, or processed and other specified locations, such as inhabited buildings, public traffic routes, and recreational areas. The safety zone distances vary depending on the quantity and hazards of the propellants involved.

Raptors: birds of prey, such as eagles, hawks, falcons, vultures, and owls.

Real Earnings: total labor and proprietor income, by place of work, in constant-year dollars. Earnings include wage and salary payments, other labor income, and income of properties. To adjust for inflation, earnings in any given year are "deflated" to a base year, which in this report is 1981. A common benchmark allows comparison of changes over time which adjust for the effects of inflation.

Real Personal Income: a basic income concept which includes earnings plus other types of income--transfer payments dividends, interest, and rent--and excludes personal contributions for social insurance (principally security taxes). Personal income also is adjusted for commuting patterns, and represents income by place of residence. When personal taxes, such as the federal income tax, are deducted from personal income, the resulting concept is disposable income. Disposable income is that sum of money which consumers either spend or save. "Real" personal income includes the adjustment for inflation; in this report, all income is reported in terms of its equivalent 1981 value.

Real Wage Levels: the money earned by a defined group of workers, e.g., construction workers, usually on an hourly basis. The term "real" indicates that wages have been measured in constant year dollars, adjusted for inflation, so that different figures over time can be compared with one another.

Refugia: localized suitable habitats for a species surrounded by unsuitable habitat from which the formerly wider-ranging species was eliminated due to environmental change.

Revegetation: regrowth or replacement of a plant community on a disturbed site. Revegetation may be assisted by site preparation, planting, and treatment, or it may occur naturally (secondary succession).

Riparian: pertaining to river and stream-side features, usually biological (e.g., riparian vegetation).

Riverine: living or situated on the banks of a river.

Section 7 Consultation: under subsection a) of Section 7 of the Endangered Species Act, each agency must consult first with the affected state and then with the Secretary of the Interior to ascertain the impact of its proposed actions on any endangered or threatened species.

Service Level Degradation: a decrease in the quality, quantity, or timely delivery of services normally made available on demand.

Short Term: a period of time between the start of construction and the achievement of a steady-state operations phase. During this period, employment needs fluctuate substantially, rising to a peak level in the earlier phase and declining in the latter. See also **Long Term**.

Significance: the importance to the resource of the impact on the resource. CEQ regulations specify several tests to determine whether an action will significantly affect the quality of the human environment. While these tests apply to the entire action, they can also be used in an amended form to judge impact significance for individual resources. It is important to note that a high impact may not be significant, while a low impact may. Significance is an either/or determination: the level of impact described either is significant or is not significant. Additionally, beneficial significance must be determined at the same level as adverse significance. As specified in the CEQ Regulations, significance needs to be determined for each of three geographic areas: local, regional, and national. This places the impact into context. Significance is also determined in terms of intensity.

Site Specific: conditions characteristic of a geographically defined location that may vary considerably from characteristics of adjacent locations or the characteristics of a larger area within which the location in question is contained.

Social Well-being Index: an index constructed from four composite indexes measuring important dimensions of social well-being (socioeconomic, health, family status, and alienation) and providing a concise overview of well-being as quality of life.

Species of Special Concern: is used in this report to refer to species protected by state endangered species legislation and/or species identified by management agencies (e.g., USFS, BLM, state game and fish) as requiring special attention due to limited distribution and/or population declines.

Therm: 100,000 Btus.

Threatened or Endangered Species: taxa that are currently listed by the U.S.. Fish and Wildlife Service as threatened or endangered under the Endangered Species Act of 1973, as amended. An endangered species is one in danger of becoming extinct in the foreseeable future; a threatened species is one likely to become endangered.

Transportation Facilities: all structures used for transportation of people or goods, including roads, railroads, and airports.

Trophic: pertains to the arrangement of plants and animals in an ecosystem according to the direction of food (energy) flows. For example, the flow of energy from plants to cows to man represents a trophic arrangement. See also **Ecosystem.**

Visibility Degradation: any adverse change in visibility consisting of either a reduction of visual range from some reference value, or a reduction in contrast between an object and the horizon sky, or a shift in coloration or light intensity of the sky or distant objects compared to what is perceived on a "clear day".

Wetlands: areas defined by the prevailing vegetation and soil moisture content and consists of vegetation typical of soils that are saturated for a major portion of the year. A fresh water marsh is an example of a wetland. Wetlands are protected by Executive Order 11990, Protection of Wetlands, and by the Fish and Wildlife Coordination Act (FWCA). The purpose of Executive Order 11990 is to avoid, to the extent possible, long- and short-term adverse impacts to wetlands unless no practicable alternative exists. The FWCA requires that fish and wildlife conservation be given equal consideration with other project features throughout the planning and decisionmaking process.

Worst Case: the combination of all the worst possible effects to result potentially from the actions of a project.

ACRONYMS AND CHEMICAL SYMBOLS AND ABBREVIATIONS

5.4 ACRONYMS AND CHEMICAL SYMBOLS AND ABBREVIATIONS

ACRONYMS (5.4.1)

A&CO	Assembly and Check-out
AF	Air Force
AFLC	Air Force Logistics Command
ALCC	Airborne Launch Control Center
AMF	Alert Maintenance Facility
ASC	Area Support Center
AS&I	Assembly, Surveillance, and Inspection
BCP	Base Comprehensive Plan
BLM	Bureau of Land Management
BMO	Ballistic Missile Office
CCD	Census County Division
CCHF	Central Cooling and Heating Facility
CDCA	California Desert Conservation Area
CEQ	Council on Environmental Quality
CIAP	Community Impact Analysis Process
CLFP	Cheyenne Light, Fuel and Power
COE	Corps of Engineers
CR	Candidate Regions
CSAP	Comprehensive Siting Analysis Process
CSB	Closely Spaced Basing
DA	Deployment Area
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of Interior
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
ENMWSP	Eastern New Mexico Water Supply Project
EMC	Electromagnetic Capability
EO	Executive Order
EPA	Environmental Protection Agency
ETSI	Energy Transportation Systems, Inc.

FLPMA	Federal Land Policy Management Act
FOC	Full Operational Capability
FSED	Full-Scale Engineering Development
FWCA	Fish and Wildlife Coordination Act
FY	Fiscal Year
HF	High Frequency
ICBM	Intercontinental Ballistic Missile
ICEP	Interagency Intergovernmental Coordination for Environmental Planning Program
IOC	Initial Operational Capability
KGRA	Known Geothermal Resource Areas
LCS	Launch Control System
LEIS	Legislative Environmental Impact Statement
LPG	Liquid Petroleum Gas
MAC	Military Air Command
MAF	Missile Assembly Facility
MCB	Marine Corps Base
MOA	Memorandum of Agreement
MOB	Main Operating Base
M-X	Missile Experimental
NAAQS	National Ambient Air Quality Standards
N(A)D	Naval (Ammunition) Depot
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOTS	Naval Ordnance Test Site
NRC	Nuclear Regulatory Commission
NTS	Nevada Test Site
NWR	National Wildlife Refuge
NWSSG	Nuclear Weapon System Safety Group
OB	Operating Base
OCC	Operational Control Center
OEA	Office of Economic Adjustment
ORV	Off-Road Vehicle
OSE	Operational Support Equipment
OSHA	Occupational Safety and Health Administration

PCSA	Preliminary Candidate Suitable Areas
PG	Proving Ground
PSD	Prevention of Significant Deterioration
QD	Quantity Distance
REE	Rare Earth Elements
ROI	Region of Influence
ROS	Recreation Opportunity Spectrum
RV	Recreational Vehicle
SAC	Strategic Air Command
SALT	Strategic Arms Limitation Treaty
SATAF	Site Activation Task Force
SAZ	Sample Analysis Zones
SCORP	State Comprehensive Outdoor Recreation Plan
SCS	Soil Conservation Service
SMSA	Standard Metropolitan Statistical Area
SNWP	Southern Nevada Water Project
SSC	System Siting Criteria
START	Strategic Arms Reduction Talks
TDS	Total Dissolved Solids
T/E	Transporter/Emplacer
TSP	Total Suspended Particulates
USFWS	United State Fish and Wildlife Service
VHF	Very High Frequency
WMA	Wildlife Management Refuge

CHEMICAL SYMBOLS AND ABBREVIATIONS (5.4.2)

CO	Carbon monoxide
HC	Hydrocarbons
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
O ₃	Ozone
Pb	Lead
SO ₂	Sulfur dioxide
SO _x	Oxides of sulfur

acre-ft	Acre feet
cf	Cubic feet
F	Degrees Fahrenheit
ft	Feet
KVdc	Thousand volts direct current
mcf	Thousand cubic feet
mi	Mile
Mwh	Megawatt-hour
Btu	British thermal units
Wh	Kilowatt-hour
mgd	Millions of gallons per day
gpcd	Gallons per capita per day
MW	Megawatt
mg/l	Milligrams per liter
ug/m ³	Micrograms per cubic meter
msl	Mean sea level

LIST OF PREPARERS AND CONTRIBUTORS

5.5 LIST OF PREPARERS AND CONTRIBUTORS

PROJECT MANAGEMENT (5.5.1)

PROGRAM COORDINATOR	ROBERT E. VAN TASSEL, M.A.
PROGRAM DIRECTOR	DAVID H. VOMACKA, Ph.D.
DEPUTY PROGRAM DIRECTOR	ROBERT CRAIG, Ph.D.
ASSISTANT PROGRAM DIRECTOR	RICHARD A. KENTRO, M.A.
PROJECT MANAGER	LOUIS E. KRUG, P.E.
PRINCIPAL INVESTIGATORS:	
QUALITY OF LIFE	QUENTIN GILLARD, Ph.D.
BIOLOGY	THOMAS W. MULROY, Ph.D.
AIR QUALITY	DAVID A. KELLERMEYER, M.S.
TRANSPORTATION	LOUIS E. KRUG, P.E.
ENERGY AND UTILITIES	JAMES N. CASTLE, M.S.
HYDROLOGY AND WATER QUALITY	RICHARD L. BATEMAN, Ph.D.
MINING AND FOSSIL FUELS	LARRY D. MILLIKEN, B.S.
SOCIOECONOMICS	RAJ. B. MATHUR, Ph.D.
LAND USE	WILLIAM LIVINGSTONE, M.S.
AMERICAN INDIANS	PHYLLIS EASLAND, M.A.
CULTURAL AND PALEONTOLOGICAL RESOURCES	CRAIG F. WOODMAN, B.A.
APPENDICES BOOK MANAGER	ROBERT W. BROWN, M.A.

QUALIFICATIONS OF CONTRIBUTORS (5.5.2)

Robert E. Van Tassel, Santa Barbara Department Manager, HDR Systems Division
B.A., 1969, Economics, University of California, Santa Barbara
M.A., 1971, Economics, University of California, Santa Barbara
Years of Experience: 19

David H. Vomacka, M-X Department Manager
B.A., 1965, Political Science, Florida State University, Tallahassee
M.S., Political Science, Florida State University, Tallahassee

Ph.D., Political Science, Florida State University, Tallahassee,

Years of Experience: 15

Eileen Ballard, Production Coordinator

B.A., 1948, English, San Jose State University

Years of Experience: 15

Richard L. Bateman, Senior Hydrogeologist, ERTEC, Inc.

B.S., 1976, Geology, Syracuse University

M.S., 1970, Hydrology, University of Nevada, Reno

Ph.D., 1976, Hydrology, University of Nevada, Reno

Years of Experience: 14

Nora B. Berwick, Biologist

B.A., 1965, Environmental Biology, University of California, Santa Barbara

M.A., 1967, Invertebrate Zoology, University of California, Santa Barbara

Years of Experience: 14

Steven H. Berwick, Senior Ecologist, Chief Scientist

B.A., 1966, University of California, Berkeley

M.S., 1968, University of Montana, Missoula

M.S., 1972, Phil, Yale University, New Haven, Connecticut

Ph.D., 1974, Yale University, New Haven, Connecticut

Years of Experience: 16

Gerald D. Bickel, Senior Hydrologist, ERTEC, Inc.

B.S., 1962, Agricultural Engineering, University of Minnesota

M.S., 1967, Civil Engineering, University of California

M.B.A., 1975, Pepperdine University

Years of Experience: 20

Robert W. Brown, Senior Editor

B.A., 1964, English, George Washington University, Washington, D.C.

M.A., 1971, English, University of California, Santa Barbara

Years of Experience: 13

Richard S. Cantey, Resource Center Manager

Years of Experience: 21

James N. Castle, Energy Planner

B.S., 1965, Case Institute of Technology, Engineering Science

M.S., 1966, Stanford University, Astronautics

Engineer, 1968, Stanford University, Astronautics

Years of Experience: 14

Donald E. Chandler, Physical Science Section Manager

B.A., 1946, Engineering, U.S. Naval Academy

M.S., 1954, Physics, University of California, Los Angeles

Ph.D., 1958, Physics, University of California, Los Angeles

Christopher Clayton, Senior Geographer

B.A., 1966, Oxford University, England

M.A., 1968, University of Cincinnati, Ohio

Ph.D., 1972, Clark University, Worcester, Massachusetts

Years of Experience: 12

Larry L. Cottrill, Economist/Regional Planning Analyst

B.S., 1971, Urban Planning, California Polytechnic University, Pomona

M.U.P., 1975, Masters Urban Planning, University of Washington, Seattle

Years of Experience: 8

Robert Craig, Deputy M-X Department Manager

B.S., 1970, Zoology, University of California, Davis

M.A., 1972, Zoology, University of California, Davis

Ph.D., 1974, Ecology, University of California, Davis

Years of Experience: 10

James R. Crowe, Staff Geographer

A.A., 1976, Geography, Glendale Community College, California

B.A., 1977, Geography, University of California, Santa Barbara

Years of Experience: 7

John G. Dudley, Senior Hydrologist

B.S., 1969, Geology, University of Wisconsin, Madison

M.S., 1972, Water Resources Management, University of Wisconsin, Madison

M.S., 1973, Hydrogeology, University of Wisconsin, Madison

Years of Experience: 9

Phyllis A. Easland, Anthropologist

B.A., 1975, Anthropology, San Diego State University, California

M.A., 1978, Cultural Anthropology, University of California, Santa Barbara

Ph.D. Candidate, 1979, Anthropology, University of California, Santa Barbara

Years of Experience: 7

Thomas R. Fahy, Director, Special Projects

B.S., 1951, Geology, California Institute of Technology, Pasadena

Years of Experience: 23

Frank G. Fox, Senior Economist

B.A., 1970, Economics, University of Washington, Seattle

M.A., 1972, Economics, University of Washington, Seattle

Ph.D., 1977, Economics, University of Washington, Seattle

Years of Experience: 10

Quentin Gillard, Senior Economic Geographer

B.A., 1969, Geography, University of Nottingham, England

M.S., 1972, Geography, Southern Illinois University, Carbondale

Ph.D., 1975, Geography, University of Chicago, Illinois

Years of Experience: 7

Douglas S. Ham, Senior Cartographer

U.S. Army Engineer Cartographic School, 1961, Ft. Belvoir, Virginia

A.A., 1972, Geography, Mesa Community College, Arizona

B.S., 1974, Geography, Arizona State University, Tempe

Years of Experience: 25

Stephen C. Helfert, Wildlife Biologist

B.A., 1976, Fish and Wildlife Biology, Texas A&M University

M.S., 1978, Biology, University of Texas at El Paso

Years of Experience: 6

Ching-San Huang, E.E., P.E.

B.S., 1966, Civil Engineering, Cheng-Kung University, Taiwan

M.S., 1968, Sanitary Engineering, Cheng-Kung University, Taiwan

Ph.D., 1972, Environmental Engineering, State University of New York at Buffalo

Years of Experience: 15

Charles M. Huckeba, Art Director

B.A., 1972, Fine Arts, University of California, Santa Barbara

Years of Experience: 10

Steven A. Hudson, Environmental Scientist

B.S., 1980, Environmental Science, Biology, University of California, Riverside

Years of Experience: 2

Dennis Iwata, Planner, AFRCE/M-X

B.S., 1972, Landscape Architecture, School of Environmental Design, Cal Poly University, Pomona

Years of Experience: 10

Larry Jack, Geologist, AFRCE/M-X

B.S., Geology, Kent State University, Kent, Ohio

Years of Experience: 8

Dorothy Jurisch, Real Estate, AFRCE/M-X

Years of Experience: 17

David A. Kellermeyer, Senior Meteorologist

B.S., 1974, Meteorology, Purdue University, West Lafayette, Indiana.

M.S., 1976, Meteorology, Pennsylvania State University, University Park

Years of Experience: 7

Patrice P. Kelly, Environmental Scientist

B.A., 1973, Chemistry, Otterbein College, Westerville, Ohio

Juris Doctor, 1980, Law, Capital University, Columbus, Ohio

Years of Experience: 9

Richard A. Kentro, Assistant to M-X Department Manager

B.S., 1968, Social Science, Michigan State University, East Lansing

B.A., 1974, Environmental Studies, University of California, Santa Barbara

M.A., 1977, Environmental Planning, University of California, Los Angeles

Years of Experience: 11

Fred W. Kuhn, Lt. Col., Attorney-At-Law

B.B.A., 1964, Finance, University of Notre Dame, Indiana

Juris Doctor, 1967, Georgetown Law Center, Washington, D.C.

Years of Experience: 13

Louis E. Krug, P.E., Project Manager

B.S.C.E., 1970, Civil Engineering, University of Santa Clara, California

M.S., 1975, Civil Engineering, San Jose State University, California

Years of Experience: 11

Kathryn J. Lett, First Lt., Environmental Project Officer, AFRCE/M-X

B.S., 1979, Civil Engineering, Union College, Schenectady, New York

Years of Experience: 3

William Livingstone, Senior Planner

B. Arch., 1950, University of Southern California, Los Angeles

M.S., 1966, Urban and Regional Planning, University of Southern California, Los Angeles

Years of Experience: 24

D. Scott Magorien, Staff Hydrogeologist, ERTEC, Inc.

B.S. 1979, Geology, Cal State University, Northridge

Years of Experience: 4

Raj B. Mathur, Socioeconomics Section Manager

B.A. with honors, 1957, Geography, Punjab University, India

M.A., 1960, Economics and Statistics, Punjab University, India

Ph.D., 1972, Geography, University of Minnesota, Minneapolis

Years of Experience: 22

Bruce J. S. McIver, Ph.D., Senior Editor and Technical Writer

B.A., 1966, English and Humanities, University of South Florida, Tampa

M.A., 1967, English, University of California, Santa Barbara

M.A., 1971, Literature, University of Kent, Canterbury, England

Ph.D., 1974, English, University of California, Santa Barbara

Years of Experience: 11

David A McPhee, AFRCE M-X, Chief Environmental Protection Planning Branch

B.S., 1970, Aeronautical Engineering, San Jose State College, San Jose, California

Years of Experience: 10

Larry D. Milliken, Senior Geologist, ERTEC, Inc.

B.S., 1972, Geology, Colorado State University

B.A., 1972, Earth Sciences, Colorado State University

Years of Experience: 10

Charles O. Morgan, Hydrologist

B.A., 1954, Geology, University of Iowa, Iowa City

M.S., 1956, Geology, University of Iowa, Iowa City

Years of Experience: 25

Thomas W. Mulroy, Manager, Biology Section

B. A., 1968, Zoology, Pomona College, Claremont, California

M.A., 1971, Biology, University of Arizona, Tucson

Ph.D., 1976, Ecology and Evolutionary Biology, University of California, Irvine

Years of Experience: 11

Robert D. Niehaus, Principal Economist

B.A., 1972, Government, Oberlin College, Ohio

Ph.D., 1979, Economics, University of Maryland, College Park

Years of Experience: 8

Robert A. Nisbet, Senior Biologist

Certificate in Cartography, USAF, 1966, Aeronautical Chart and Information Center

B.S., 1965, Forest Management, Humboldt State University, Arcata, California

M.S., 1969, Biology, San Diego State University, California

Ph.D., 1972, Plant Ecology, Arizona State University, Tempe

Years of Experience: 16

W. Allen Nixon, GS-13, Economist

B.S.A., 1971, Economics, University of Georgia, Athens

M.S.A., 1973, Economics, University of Georgia, Athens

Years of Experience: 9

Riccardo L. Notini, Staff Hydrologist, ERTEC, Inc.

B.S., 1978, Environmental Science, University of Massachusetts, Amherst

M.S., 1980, Water Science, University of California, Davis

Years of Experience: 3

John B. Opfell, Ph.D., Senior Chemical Engineer

B.S., 1945, Chemical Engineering, University of Wisconsin, Madison

M.S., 1947, Chemical Engineering, California Institute of Technology, Pasadena

M.B.A., 1951, Business Administration, Stanford University, Palo Alto, California

Ph.D., 1954, Chemical Engineering and Mathematics, California Institute of Technology, Pasadena

Years of Experience: 30

Shirley Perizzolo, Technical Editor and Production Coordinator

B.S., 1975, Library Studies, Western Australian Institute of Technology

Years of Experience: 7

Joseph A. Rea, Lt/Col Retired, Mechanical Engineer

B.S., 1949, Mechanical Engineering, Oklahoma State University, Oklahoma

Years of Experience: 30

Jeff M. Reece, Chemical and Civil Engineer

B.S., 1968, Chemical Engineering, Massachusetts Institute of Technology, Cambridge

M.S., 1974, Civil Engineering, University of California, Berkeley

Years of Experience: 9

Kenneth L. Reed, Systems Ecologist

B.A., 1965, Zoology, University of Washington

M.S., 1968, Plant Physiology, University of Washington

Ph.D., 1972, Forest Ecology, Oregon State University

Years of Experience: 10

James Robbins, Environmental Research Assistant

B.A., 1980, Geography and Economics, University of California, Santa Barbara

M.A., 1982, Economics, University of California, Santa Barbara

Years of Experience: 3

Mark Schniepp, Economist

B.A., 1976, Economics, University of California, Santa Barbara

Ph.D., 1981, Economics, University of California, Santa Barbara

Years of Experience: 5

Katherine W. Sharp, Social Psychologist

B.A., 1977, Wellesley College, Massachusetts

M.A., 1980, Environmental/Social Psychology, Claremont Graduate School

Years of Experience: 2

Robert Silsbee, Economist

B.A., 1980, Economics and Environmental Studies, University of California, Santa Barbara

Years of Experience: 2

Thomas L. Smith, Environmental Engineer

B.S., 1964, Mechanical Engineering, University of Miami, Coral Gables, Florida

Years of Experience: 10

John Steinbeck, COE, P.E.

B.S., 1966, University of Illinois

M.S., 1967, University of Missouri

Years of Experience: 15

James E. Straub, Civil Engineer, Professional Engineer, Utah

B.S., 1968, Civil Engineering, Cornell University, Ithaca, New York

M.S., 1979, Management, Troy State University, Troy, Alabama

Years of Experience: 10

David A. Taggart, Maj., Judge Advocate, Attorney

B.S., 1969, Chemistry, United States Air Force Academy, Colorado

Juris Doctor, 1972, University of Texas School of Law, Austin

L.L.M., 1981, Environmental Law, Columbia University, New York City

Years of Experience: 10

Robin J. Tausch, Terrestrial Ecologist

B.S., 1970, Wildlife Management, Humboldt State University, Arcata, California

M.S., 1973, Range Management, University of Nevada, Reno

Ph.D., 1980, Range Ecology, Utah State University, Logan

Years of Experience: 17

Rosemary A. Thompson, Senior Biologist

B.A., 1967, Zoology, University of Missouri, Columbia

Ph.D., 1972, Marine Biology, University of California, San Diego

Years of Experience: 13

Robert J. Verlaan, Environmental Analyst

A.A., 1975, General Studies, Santa Barbara City College, California

B.A., 1977, Experimental Psychology, Westmont College, Santa Barbara, California

Years of Experience: 6

Jeff D. Vitucci, Economist

B.A., 1974, Environmental Studies, San Jose State University, California

M.A., 1978, Urban Economics, University of California, Santa Barbara

Years of Experience: 7

Irvin M. Waitsman, Site and Environmental Planner, Engineer

B.S., 1957, Civil Engineering, Michigan State University, East Lansing

M.B.A., 1963, Business Administration, San Diego State University, California

M.A., 1970, Marine Affairs, University of Rhode Island, Kingston

Years of Experience: 24

To-Far Wang, Economist

B.A., 1976, Economics, National Chung Hsing University, Taipei

M.A., 1980, Economics, University of California, Santa Barbara

Ph.D. Candidate, 1982, Economics, University of California, Santa Barbara

Years of Experience: 7

Mary Watros, Staff Geologist, ERTEC, Inc.

B.S., 1981, Geology, State University of New York

Years of Experience: 1

Howard K. Watts, Archaeologist

B.A., 1969, Anthropology, University of Denver, Colorado

M.A., 1971, Anthropology, University of Denver, Colorado

Years of Experience: 10

Robert C. Whitmore, Senior Ecologist

B.A., 1970, Biology, California State at Fullerton

Ph.D., 1975, Zoology, Brigham Young University

Years of Experience: 10

Craig F. Woodman, Archaeologist

B.A., 1973, Wichita State University

M.A., 1982, University of California, Santa Barbara

Years of Experience: 10

Jeffrey M. Young, Environmental Geoscientist

B.S., 1976, Geography/Geology, Lock Haven State College, Pennsylvania

M.A., 1978, Geography, Arizona State University

Years of Experience: 5

Stephen E. Ziemer, Meteorologist

1969, Fixed Plant Microwave Carrier Repair, Ft. Monmouth Electronics School,
Monmouth, New Jersey

B.S., 1976, Thermal and Environmental Engineering, Southern Illinois University,
Carbondale

M.S., 1978, Thermal and Environmental Engineering, Southern Illinois University,
Carbondale

Years of Experience: 4

BIBLIOGRAPHY

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